

# The Affordable Care Act and Opportunities for Change in North Carolina's Commercial Fisheries

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## ABSTRACT

Commercial fishing is generally hazardous, but some types of commercial fishing are more dangerous than others. Since much of the fishing industry is composed of small family-owned businesses, commercial fishermen often have to rely on the private health insurance markets. Do commercial fishermen working in more dangerous areas or with more dangerous gear mitigate their risk by purchasing health insurance? I examine the relationship between the economics of the North Carolina commercial fishing fleet and private market health insurance purchases in the two years immediately preceding the passage of the Affordable Care Act (ACA) of 2010. Establishing this baseline is important, as the slow implementation of the Act's expanded coverage will take time to make meaningful impacts on commercial fishing fleets. I close by considering which aspects of commercial fishing might be most affected by the ACA.

**Key words:** Affordable Care Act, ACA, commercial fisheries, fisheries management, fishing communities, health care.

**JEL Codes:** D78, H51, I100, I13, N52, Q22, Q28, Q58.

## INTRODUCTION

Despite its notoriety as the most dangerous profession (Janocha 2012), the US commercial fishing industry's current relationship to the health insurance market is largely unknown. State workers' compensation for on-the-job injuries does not extend to commercial fishing operations, making insurance coverage extremely important for working fishermen. Until 1980, commercial fishermen were eligible to use the marine hospital system of the US Public Health Service, although that coverage was incomplete. That service was dropped by the Reagan administration as part of a general budget cut (Randall and Grader 2010). Since much of the fishing industry is composed of small family-owned businesses, commercial fishermen now have to rely on the private health insurance markets, health insurance offered through landside jobs, spouses' plans, Medicare, or (alternatively) forgo coverage altogether.

Understanding health insurance in commercial fisheries is important because although commercial fishing is generally a hazardous profession, some aspects of commercial fishing are

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more dangerous than others. Do commercial fishermen working in more dangerous areas or with more dangerous gear mitigate their risk by purchasing health insurance? If so, the recent increase in health coverage affordability via the Affordable Care Act (ACA) of 2010 may lead to changes in the profitability and makeup of the commercial fishing fleets.

I examine the relationship between health insurance purchases and the actions of the North Carolina commercial fishing fleet in the two years immediately preceding the passage of the ACA. I utilize data on North Carolina commercial fishermen drawn from two surveys and match it with individual landings records to model the relationships between purchasing health insurance and variables such as coverage and area worked, gears used, and sociodemographic factors. Establishing this baseline is important, as the slow implementation of the Act's expanded coverage will take time to make meaningful impacts on commercial fishermen's coverage. I close by considering which aspects of commercial fishing might be most affected by the ACA in preparation for a follow up study beginning in 2016.

## METHODS

To conduct the analysis, I used data from two sequential surveys conducted by the Socioeconomic Program of the North Carolina Division of Marine Fisheries (DMF). The Division has been surveying commercial fishermen on a rotating geographic basis since Diaby (2000), but only began asking respondents about health insurance coverage in 2008. The data set does not cover all areas of the state's coast, but does offer a comparison of fishermen working in two different coastal environs: those who work in the inshore areas in the southern third of the coast (Crosson 2010) and those working any part of the Atlantic Ocean from the beaches to the end of the US Exclusive Economic Zone (EEZ) 200 miles from shore (Crosson 2009). Surveys were conducted via phone interviews, and detailed information on the survey instruments and response rates can be found in those memoranda. Previous analyses of the data from these studies has established the links between social and economic descriptors of North Carolina's commercial fishermen and attitudes towards management (Crosson 2011) and fisheries exit (Crosson 2015).

The data set for this project consisted of 319 completed surveys, of which 149 were from inshore-working fishermen and 170 were from ocean-working fishermen. The data set also incorporated their annual landings values from the state's trip ticket program. The original survey data instruments were long, with over 75 questions, two of which were directly related to health insurance: "Do you have health insurance?" (binary) and, if the respondents answered yes, "Who pays for it?" Answers to the latter question were limited to either "self," "other job," "spouse's plan," or "other." My primary interest was in determining which types of fishermen had made the decision to purchase health insurance coverage; i.e., who was most likely to choose "self" in answer to "Who pays for it?" Accordingly, I reviewed the literature on which other sociodemographic or economic variables in the data set might best predict the answer to that question.

The literature on health insurance of commercial fishermen is minimal at best, but the related subjects of occupational health and safety in fisheries analyzes which characteristics of fishermen and fishing businesses that might increase risk. I follow the logic of Windle et al. (2008) that  $RISK = PROBABILITY * CONSEQUENCE$ , and posit that fishermen would use

that formula to assess the potential impacts of job-related injuries with and without health insurance coverage and make the tradeoffs of out-of-pocket costs versus potential benefits. I posit that the choice to purchase is at least partially to insure against the consequences of being injured on the job, which for independent business owners (as most all North Carolina fishermen are) also includes the potential loss of earnings while recuperating.

A myriad of variables could potentially change the probability of being injured while commercial fishing. In a review of 574 hospitalized injuries from commercial fishing in Alaska, Thomas et al. (2001) found injuries were usually from falls on deck, entanglement in machinery, or being struck by an object. More specific to North Carolina, penetrating wounds from sea life and strained backs are common among the state's commercial fishermen (Marshall et al. 2004), as are injuries caused by knives, hooks, and other sharp objects (Kucera et al. 2010). Lipscomb et al (2004) found the rod and reel to cause the highest injury rates among different gears, causing repetitive wrist injuries as well as cuts/infections from the constant baiting of hooks and removing fish from the same. Kucera et al. (2009) also noted significant lower back pain from the use of net reels and trap pulls and from sorting the catch on board, which are common tasks for the crab pot and gill net fisheries. Huang et al. (2012) found that the North Carolina shrimping fleet is less likely to attempt harvest as winds and waves rise, which is likely due to concerns about both the profitability and safety of bad-weather trips that utilize heavy trawl doors and wide booms. I tested for relationships between health insurance purchase and the respondent's reported use of the four most common gear types among respondents: crab pots, shrimp trawls, gill nets, and rod and reels.

The inshore saltwater fisheries of the southeast NC coast are sheltered and extremely close to land, below the large Albemarle and Pamlico Sounds (see figure 1), and fishermen working these small bays and inlets take much shorter trips to tend their gear (and are consequently exposed to fishing risks for much shorter time periods in a near-waveless environment) than the fishermen who work offshore in the ocean proper. Thus, I also reviewed the differences in health insurance purchases for the two groups overall. Offshore conditions often restrict the ability of the state's ocean fleet to venture out of the inlets altogether, which has sometimes caused political problems when the state shares fisheries quotas with more temperately weathered states to the south (especially Florida) for the area under the jurisdiction of the South Atlantic Fishery Management Council (e.g., SAFMC 2015).

Theorizing that fishermen who are more economically engaged in commercial fishing suffer greater consequences from being injured on the job, I tested whether fishing income in the year of the survey had any influence on health insurance purchase. I included the estimated value of capital wrapped up in fishing vessels and gear for much the same reason; if a fisherman is seriously injured, then presumably he cannot use that gear as efficiently.

To control for the effects of non-fishing variables on making that purchase, I investigated the impact of demographic variables from the surveys that might be associated with an increased chance of purchasing health care coverage apart from decisions based on fishing. Fishermen's ages were a consideration, both because older people are more likely to suffer health issues and because the overwhelming majority (78%) of fishermen who chose "other" as a source of coverage were age 65 or older and thus covered by Medicare. I hence included both an age variable and a dummy variable for a fishermen being under the age of 65. Household income (as compared to only fishing income) was expected to be positively correlated with cov-

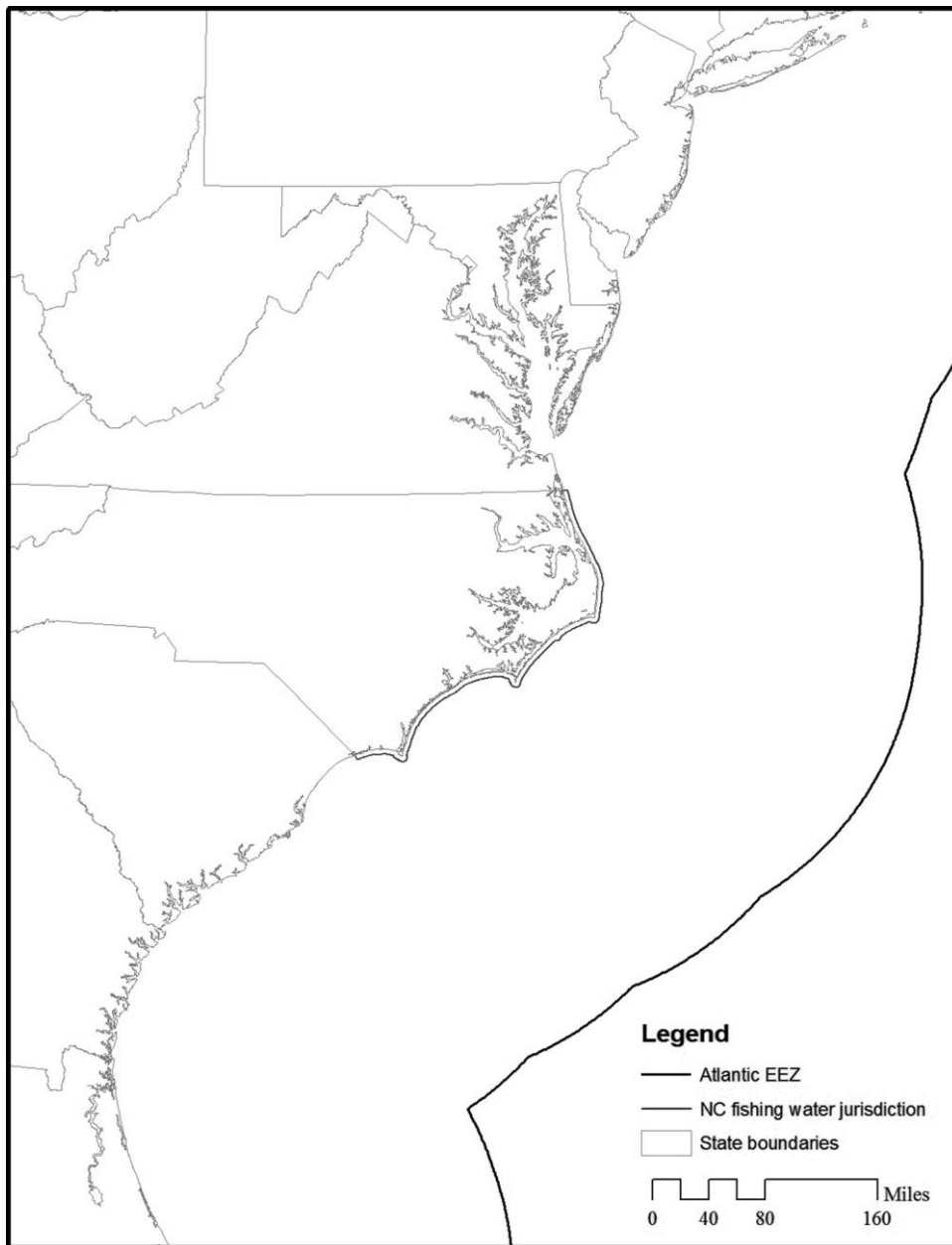


Figure 1. State and Federal Fishing Areas off the North Carolina Coast

erage, since wealthier households can more likely afford it. Years of education and fishing experience may influence perceptions of risk, so I included those variables. Because coverage under a spouse's plan is an option for many people, this could potentially make purchasing insurance unnecessary. I did not have information on whether individuals had access to that option, so I tested for the impact of a marriage binary (currently married or not) as an ad-

mittedly imperfect proxy.<sup>1</sup> I included household size as a proxy for having children in the house, which also might add an incentive to purchase coverage through a family plan.

## RESULTS

The final model included five fishing behavior-based variables that might affect the probability of a significant fishing injury (four dummy variables for gear use, one for fishing in the ocean), two measurements of fishing involvement that would capture some of the consequences of that injury (value of landings and fishing capital), and seven sociodemographic factors that might also be considered by a fishermen considering the choice to purchase on the health insurance market. The means and standard deviations for answers from the 319 respondents are listed in table 1. For interval-level data, I tested for significant differences between the fishermen who did and did not report purchasing their own health insurance using *t*-tests. For binary-level data, I did the same using chi-square tests.

Older, white, non-employee males are known to be at higher risk of being uninsured (Cawley, Moriya, and Simon 2015), so fishermen might be expected to have lower rates of insurance coverage than the statewide average of ~82% during the time of the survey (US Census Bureau 2015). As reported in the original studies (Crosson 2009, 2010), this is only partially the case. Fishermen working in the Atlantic Ocean environ were significantly more likely to have health insurance coverage from any source (79%) than those working in the inshore waterways (55%) ( $p < .001$ ). The higher coverage rates of ocean-working fishermen was directly a consequence of their choices to purchase health insurance coverage at much higher rates (40%) than inshore fishermen (11%) ( $p < .001$ ). If the purchase decision is motivated by an assessment of risk, then this supports findings that working in the ocean causes higher injury rates due to fatigue (Jin, Kite-Powell, and Talley 2001; Matheson et al. 2001; Kucera et al. 2010) and that North Carolina fishermen are attempting to mitigate that.

I found a difference in purchasing decisions with another behavior-related variable. Fishermen who reported using a rod and reel were slightly more likely to purchase health coverage (34%) than the rest of the population of fishermen (23%) ( $p < .05$ ). In contrast, the use of gill nets, shrimp trawls, and crab pots did not indicate significantly different patterns of health insurance purchasing. This is in keeping with findings by Lipscomb et al. (2004) that line use was the highest injury-causing mode of commercial fishing in North Carolina due to the repetitive baiting involved. However, the significance of this result is significantly weakened by the fact that rod and reel fishermen almost exclusively worked in the ocean.

Both measures of fishing involvement (catch levels value and capital investment) were also signifiers of health insurance purchasing. The mean landings value for the year of the survey of fishermen who purchased their own health insurance was \$85,518 (versus \$21,387 for those who did not,  $p < .001$ ), and they had an average of \$183,887 in fishing capital (versus \$51,700,  $p < .001$ ). Four of the sociodemographic variables showed significant differences: being under the age of 65 (the age of Medicare eligibility), education, household income, and household size. Many of these differences, except marital status, were conflated with the differences in

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1. Thirty-six fishermen from the surveys reported having insurance through a spouse's plan, which is only a subset of those who might conceivably have access to that option (which would likely require paying a premium as well). I left them in the data set because their presence did not significantly affect the model, and because they will be part of the longitudinal follow up study.

Table 1. Comparison of Means for Responses to the Binary Variable (1=yes, 0=no) Purchased Own Health Insurance

Variable	Mean (standard deviation)
Fishing in the ocean (1 = yes, 0 = no)	0.53(0.50)***
Fishing with rod and reel (1 = yes, 0 = no)	0.34(0.47)*
Fishing with a shrimp trawl (1 = yes, 0 = no)	0.15(0.36)
Fishing with a gill net (1 = yes, 0 = no)	0.37(0.48)
Fishing with a crab pot (1 = yes, 0 = no)	0.08(0.27)
Catch landings value	\$38,053(\$86,343)***
Boat and gear value	\$86,922(\$176,655)***
Age	51.80(13.21)
Under age 65 (1 = yes, 0 = no)	0.82(0.38)**
Fishing experience (years)	25.36(14.67)
Education (years)	12.19(2.83)**
Marital status (1 = currently married, 0 = not currently married)	0.75(0.44)
Household income	\$43,076(\$29,189)***
Household size	2.44(1.15)*

Note: Two-sample t-tests for differences in means for interval-level data, chi-square tests for independence for binary-level data indicated by \*\*\*  $p < .001$ , \*\*  $p < .01$ , \*  $p < .05$ .

fishermen working the two different regions, and some are correlated with one another (although only landings value and gear value exhibited a Pearson's  $R > .5$ ), so I ran a probit-based regression using all variables with the decision to purchase health insurance as the binary dependent variable. Results for the probit are reported in table 2. Using a rod and reel, ocean fishing, landings and capital values, being under 65, and education were significant coefficients in the regression. The square roots of the variance inflation factors are all under 1.5, so multicollinearity does not appear to be an issue for this regression. I ran a second version of the regression which included only those variables that tested as significant in table 1, which

Table 2. Determinants for the Binary Variable (1 = yes, 0 = no) Purchased Own Health Insurance

Variable	Coefficients (all)	Coefficients (limited)
Intercept	-4.676***	-2.917***
Fishing in the ocean (1 = yes, 0 = no)	.7996**	.7154*
Fishing with rod and reel (1 = yes, 0 = no)	-.5485*	-.5998*
Fishing with a shrimp trawl (1 = yes, 0 = no)	.2527	
Fishing with a gill net (1 = yes, 0 = no)	-.0808	
Fishing with a crab pot (1 = yes, 0 = no)	.3593	
Catch landings value (units of \$10,000)	.0335*	.0376*
Boat and gear value (units of \$10,000)	.0174*	.0160*
Age	.0200	
Under age 65 (1 = yes, 0 = no)	.8977*	.4857†
Fishing experience (years)	.0023	
Education (years)	.1072**	.0957**
Marital status (1 = currently married, 0 = not currently married)	.0652	
Household income (units of \$10,000)	.0423	.0421
Household size	.0253	.0054

Note: Probit model results. Coefficient significance indicated by \*\*\*  $p < .001$ , \*\*  $p < .01$ , \*  $p < .05$ , †  $p < .1$ . Limited model has a lower AIC.

is also shown in table 2. Changes in the coefficients were generally minor, with a very small improvement in the AIC, indicating that the basic model is robust.

The results from the probit model indicate that fishing-related factors (area fished and level of economic involvement) rather than sociodemographic variables drove the fishermen's decisions to purchase. The significance of household income from the interval tests, but not in the regression, is likely due to the correlation with the more important fishing income variable. Marital status and household size is either unimportant as an indicator of purchasing or an imperfect measure that should be refined in the follow-up study to specifically target spousal coverage options and the presence of dependents in the household. Age matters only so far as it allows the option for Medicare coverage.

## DISCUSSION AND CONCLUSION

Fishermen with higher fishing incomes and capital investments have more to lose from the consequences of injury (Smith and Wilen 2005), and I found that those variables are also strong indicators of health insurance purchasing in the pre-ACA era. Non fishing-related demographic variables do not seem to influence purchase, with the exception of education (see Cutler and Lleras-Muney 2006) and Medicare eligibility.

Being a commercial fishermen is a risk factor for not having health coverage at all (Swartz, Marcotte, and McBride 1993), and commercial fishermen have often been ineligible to purchase many plans due to the insurance industry's perception of increased risk (Light 1992). Given the high cost of purchasing health insurance on the open market before the ACA, it is noteworthy that many commercial fishermen were willing to shoulder the additional expense. The results here indicate that the decision may be heavily influenced by the perceived risks and consequences of fishing-related injuries. From the results shown here, I pose several potential impacts of the ACA on commercial fishing.

First, many commercial fishermen already paying for insurance will realize a significant decrease in their business costs from the subsidies available under the ACA. Subsidies for the ACA are available for household incomes of up to 400% of the poverty guidelines of the US federal poverty level (KFF 2015a), and early estimates are that 85% of those signing up during ACA open enrollment are eligible for insurance premium subsidies (Blumenthal and Collins 2014). Using values from the surveys, a "median" fisherman who reported paying for his/her own insurance during the pre-ACA time of this survey<sup>2</sup> could receive insurance subsidies of approximately \$13,799 (inshore fleet) and \$6,788 (offshore fleet) per year (KFF 2015b). Fishermen may treat this as additional household income, or reinvest it as additional business capital. The latter would tend to increase fleet capacity. Overall, the benefits will disproportionately flow towards lower-income recipients, which is inherent in the design of the ACA (Buettgens, Garrett, and Holahan 2010), which will lower income disparities among the commercial fleet. For these fishermen, as with many other Americans, the benefits of the ACA may be more economic than physical (Orentlicher 2014).

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2. Estimates were generated for the Silver Plan using the median household income, ages, and household size for the inshore (\$22,500, 54, 2) and offshore (\$62,500, 51, 2) respondents who reported paying for their own insurance at the time of the pre-ACA surveys. They are for a household of two adults, non-smokers, of the same age. Actual subsidies are likely to be lower, since the subsidies are based on adjusted gross income rather than the estimates I received from the respondents.



Second, many uninsured commercial fishermen will benefit from the subsidies available under the ACA, but this will increase business costs. Fishermen who self-reported as being uninsured before the ACA may choose to divert a portion of their fishing income away from household consumption and towards more affordable health insurance premiums, but also may choose to divert that income from boat and gear investments, which may lower their long-term productivity. The ACA may reduce the percentage of uninsured up to 70% (Schoen et al. 2011), so the cumulative effects of these individual choices may be substantial.

Finally, the availability of ACA subsidies may lead to changes in the size, behavior, and composition of the commercial fleets. Fishermen who reported that they received health insurance coverage from a non-fishing job averaged much lower annual landings values (\$7,377) than the average respondent (\$30,558), unsurprisingly. They also had higher average household incomes (\$62,744 versus \$43,076, respectively). It is unknown to what degree the option of purchasing subsidized health insurance may lure some of these part-time fishermen into increasing the fishing contributions to their income at the expense of their employed labor, but the available subsidies would certainly lower the risks in comparison to before the ACA, as has been theorized may happen with part-time farmers (Bharadwaj, Findeis, and Chintawar 2013; D'Antoni, Mishra, and Khanal 2014). Finally, if health insurance purchase has been partially driven by a need for risk mitigation, then ACA subsidies may lessen the fear of fishing in areas or with gears that are considered higher risk.

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